

ABSTRACT

A multi-table-based grant generator in accordance with the present invention solves the issue of bandwidth granularity, while maintaining the simplicity of a table approach. The present invention grant generator provides grants of fine granularity for regulation of upstream transmission of cells in an ATM PON. Multiple grant tables having differing bandwidth granularities are linked together through a simple grant distribution mechanism. The grant tables and grant distribution mechanisms can be recursively linked to achieve a number of different granularities. The grant generator of the present invention is based on multiple grant tables with a combination of multiplexers, dividers, and address counters. The grant generator provides both larger and smaller bandwidths for data grants as well as PLOAM grants without large size grant tables. In one exemplary embodiment of the present invention, improved granularity is achieved, where a first grant table is used for one size of bandwidth grant, e.g., data grants, and the second grant table is used for another size of bandwidth grant, e.g., low bandwidth data grants as well as PLOAM grants. A simple clock divider couples to each of the grant tables through corresponding address counters. The clock divider provides a set number of bandwidth grants from each table over a complete cycle. The clock divider also selects an appropriate input port of a multiplexer through which the grants from each grant table are respectively transmitted. By having the ability to issue variable sized bandwidth grants, the granularity is significantly improved, thereby translating to a more efficient use of the bandwidth. More specifically, grants of a finer granularity can be issued without the need for an excessively large grant table usually thought to be necessary to produce fine granularities.